broadcast channel can be related to the same service and can include an audio component and a video and/or a digital data stream comprising auxiliary information, or another audio component to insert advertising information relating to the audio or video program.

5   In accordance with an aspect of the present invention, the programming center 20 is also configured to perform file transfers to one or more receivers 14. It can be useful to transmit data to the receivers 14 that is not necessarily one of the broadcast programs such as a music program or news program. For example, a car manufacturer may wish to send a software update to all vehicles of a particular model and

10   manufacturing date, in which case, the user would not be playing back the transferred file. It may be desirable to send a mobile receiver updated maps or local weather or traffic reports, which the user can review on-demand as described in the above-referenced patent application Serial No. _____. As discussed above, these types of files

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are generally large files that would require a significant amount of the instantaneous

15   broadcast system bandwidth if broadcast as one program. Further, the vehicle(s), from which the receivers 14 intended to receive the file are operated, may not be in use during the entire transmission of such a file.

     In accordance with the present invention, a file 34 to be transferred via the digital broadcast system such as the system 10 is partitioned at the program center 20, broadcast

20   station 18 or other device in the transmit segment of the system for transmission as segments 36, as shown in Figs. 3 and 4. The partitioning of the file 34 allows for smaller portions of the file (e.g., 8 kbps channels) to be interspersed with other broadcast content, thereby reducing the demand on the instantaneous bandwidth of the system. As shown in Fig. 5, the segments 36 are provided with headers 37 to facilitate their capture

25   in a local storage device at the receiver 14. The baseband data stream illustrated in Fig. 5 can then be modulated and multiplexed as needed for transmission via the composite data stream illustrated in Fig. 2, for example.

     With continued reference to Fig. 5, the segments 36 in a segmented file 34 (e.g., file 45 in Fig, 3) are each provided with a segment header 37 comprising a broadcast

30   identifier (ID) field 38, an auxiliary data field 39, a file number field 40, a segment

broadcast system which minimizes the impact on system bandwidth requirements for transmitting other broadcast programs.

File transfers between devices in two-way communication systems (e.g., packetized transmission between network computers using a protocol such as TCP/IP)
5   are facilitated by the ability of the devices to acknowledge successful transmission of packets and to request retransmission of those packets that were not successfully received. Digital broadcast signals, however, generally do not have a back channel with which a receiver can inform the broadcast station that part of a file was not successfully received. In co-pending U.S. patent application Serial No ~~____~~ 09/695,315 ~~(attorney's file 40555)~~, a
10   satellite receiver in a vehicle operates in conjunction with a cellular telephone to provide a back channel for such revenue-generating communications as transmitting GPS coordinates to a vehicle fleet operations control center. File transfer messaging (e.g., transmission acknowledgments and retransmission requests) is not a cost-effective use for such a back channel.

15   In addition, mobile satellite receivers can be subject to service outages from loss of line of sight reception due to physical obstructions, as well as from interference. Mobile satellite receivers are also turned off for periods of time when the vehicle is not in use. Accordingly, a need exists for a file transfer mechanism in a digital broadcast system which does not require a back channel between the receiver and the broadcast station
20   and which provides means for overcoming data loss due to obstructions, interference or other interruptions during file transfer such as interruptions in vehicle use.

Summary of the Invention:

In accordance with the present invention, a method and apparatus for
25   implementing the transfer of files to receivers in a digital broadcast system which does not require a significant amount of the instantaneous bandwidth of said digital broadcast system.

In accordance with an aspect of the present invention, the data files are partitioned into segments that are interspersed in a broadcast signal. Segment headers
30   are provided for respective segments to indicate the number of said segments that

40554

Patent Application

of

Paul D. Marko

and

Craig P. Wadin

for

METHOD AND APPARATUS FOR IMPLEMENTING FILE TRANSFERS TO RECEIVERS IN A DIGITAL BROADCAST SYSTEM

<u>Cross Reference to Related Applications:</u>

Related subject matter is disclosed and claimed in co-pending U.S. patent application of Paul D. Marko et al filed even date herewith for "Method and Apparatus for Employing Stored Content at Receivers to Improve Efficiency of Broadcast System Bandwidth Use" ~~(attorney's file 39566)~~ *09/695,226* in co-pending U.S. patent application of Paul D. Marko et al filed even date herewith for "Method and Apparatus for Controlling User Access and Decryption of Locally Stored Content at Receivers in a Digital Broadcast System" ~~(attorney's file 39920)~~ *09/695,081* in co-pending U.S. patent application of Paul D. Marko et al filed even date herewith for "Method and Apparatus for Prompting a Reverse Channel Response From a Receiver in a Digital Broadcast System" ~~(attorney's file 40555)~~ *09/695,315* in co-pending U.S. patent application of Paul D. Marko et al filed even date herewith for "Method and Apparatus for Providing On-Demand Access of Stored Content at a Receiver in a Digital Broadcast System" ~~(attorney's file 40557)~~ *09/695,139* in co-pending U.S. patent application Serial No. 09/388,926, filed by Hien D. Ma et al on November 4, 1999; and in co-pending U.S. patent application Serial No. 09/433,862, filed by Paul D. Marko et al on November 4, 1999; all of said applications being expressly incorporated herein by reference.

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